

Table 8-4. Range of Detection and Quantitation Limits of Current Analytical Methods for Recommended Target Analytes^a

Target analyte	SV ^b	Range of detection limits	Range of quantitation limits	Target analyte	SV ^b	Range of detection limits	Range of quantitation limits
Metals				Organochlorine Pesticides^j			
Arsenic (inorganic)	3 ppm	5-50 ppb ^c ; 50-100 ppb ^d	—	(continued)			
Cadmium	10 ppm	0.005-0.046 ppm ^e ; 0.4 ppm ^f	—	Endrin	3,000 ppb	<1-15 ppb	2-15 ppb ^{j,k}
Mercury	0.6 ppm	0.0013-0.1 ppm ^g	—	Heptachlor epoxide	10 ppb	0.1-5 ppb	2-15 ppb ^{j,k}
Selenium	50 ppm	0.017-0.15 ppm ^c ; 0.02 ppm ^h ; 0.6 ppm ^f	—	Hexachlorobenzene	70 ppb	0.1-2 ppb	2-15 ppb ^{j,k}
Tributyltin	0.3 ppm	2.5 ppb ^e ; 2-5 ppb ⁱ	—	Lindane	80 ppb	0.1-5 ppb	2-15 ppb ^{j,k}
Organochlorine Pesticides^j				Mirex	2,000 ppb	0.1-5 ppb	2-15 ppb ^{j,k}
Chlordane (total)	80 ppb			Toxaphene	100 ppb	3-100 ppb	60-153 ppb
cis-Chlordane		<1.5-5 ppb	2-20 ppb ^{j,k}	Organophosphate Pesticides^j			
trans-Chlordane		<1.5-5 ppb	2-15 ppb	Chlorpyrifos	30,000 ppb	10 ppb	2.5 ppb ^k
cis-Nonachlor		<1.5-5 ppb	2-15 ppb	Diazinon	900 ppb	50 ppb	—
trans-Nonachlor		<1.5-7 ppb	2-15 ppb	Disulfoton	500 ppb	—	—
Oxychlordane		<1.5-5 ppb	2-15 ppb	Ethion	5,000 ppb	20 ppb	—
DDT (total)	300 ppb			Turbufos	10,000 ppb	—	—
4,4'-DDT		0.1-13 ppb	2-15 ppb	Chlorophenoxy Herbicides			
2,4'-DDT		0.1-10 ppb	2-15 ppb	Oxyfluorfen	800 ppb	—	—
4,4'-BBB		0.1-10 ppb	2-15 ppb	PAHs^l			
2,4'-BBB		0.1-10 ppb	2-15 ppb		10 ppb	10-100 ppb	330 ppb
4,4'-DDE		0.1-38 ppb	2-15 ppb ^{j,k}	PCBs^j			
2,4'-DDE		0.1-10 ppb	2-15 ppb	(total Aroclors)	10 ppb	50 ppb (20-62 ppb) ^m	— (110-170 ppb) ^m
Dicofol	10,000 ppb	100 ppb	2.5 ppb	Dioxins/furans^k			
Dieldrin	7 ppb	0.1-5 ppb	2-15 ppb	(total)	0.7 ppt		
Endosulfan (total)	60,000 ppb			TCDD/TCDF		1 ppt	—
Endosulfan I		5 ppb	—	PeCDD/PeCDF		2 ppt	—
Endosulfan II		5-70 ppb	—	HxCDD/HxCDF		4 ppt	—
				HpCDD/HpCDF		10 ppt	—

PAHs = Polycyclic aromatic hydrocarbons. PCBs = Polychlorinated biphenyls. SV = Screening value (wet weight).

(continued)

Table 8-4 (continued)

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- ^a Wet weight. Summarized from Appendix H.
- ^b From Table 5-2. Except for mercury, SVs are for general adult population using RfDs or oral slope factors available in the EPA IRIS database and assuming a consumption rate (CR) = 6.5 g/d, average body weight (BW) = 70 kg, lifetime (70-yr) exposure, and, for carcinogens, a risk level (RL) = 10^{-5} . The RfD of 3×10^{-4} mg/kg/d for chronic systemic effects of methylmercury that was listed in IRIS through April 1995 was lowered by a factor of 5 to calculate the recommended SV of 0.6 ppm in order to account for a possible fivefold increase in fetal sensitivity to methylmercury exposure (WHO, 1990). This approach is consistent with, but somewhat more protective than, use of the current IRIS (1995) RfD of 1×10^{-5} mg/kg/d for the developmental effects of methylmercury (see Section 5.3.1.2). This approach should be considered interim until such time as the Agency has reviewed new studies on the chronic and developmental effects of methylmercury. **Note:** Increasing CR, decreasing BW, and/or using an RL $< 10^{-5}$ will decrease the SV. Program managers must ensure that detection and quantitation limits of analytical methods are sufficient to allow reliable quantitation of target analytes at or below selected SVs. If analytical methodology is not sensitive enough to reliably quantitate target analytes at or below selected SVs (e.g., dieldrin, heptachlor epoxide, toxaphene, PCBs, dioxins/furans), the program managers must determine appropriate fish consumption guidance based on lowest detectable concentrations, or provide justification for adjusting SVs to values at or above achievable method detection or quantitation limits. It should be emphasized that when SVs are below method detection limits, the failure to detect a target analyte cannot be assumed to indicate that there is no cause for concern for human health effects.
- ^c Analysis by hydride generation atomic absorption spectrophotometry (HAA) with preconcentration (E. Crecelius, Battelle Pacific Northwest Laboratories, Marine Sciences Laboratory, Sequim, WA, personal communication, June 1995)..
- ^d Analysis by high-performance liquid chromatography/mass spectrometry (HPLC/MS) (E. Crecelius, Battelle Pacific Northwest Laboratories, Marine Sciences Laboratory, Sequim, WA, personal communication, June 1995).
- ^e Analysis by graphite furnace atomic absorption spectrophotometry (GFAA). **Note:** This method is not specific for tributyltin. Depending on the extraction procedure, mono-, di-, and tetrabutyltin may also be included in the analysis. Also, this method does not distinguish between butyltins and other alkyltins (E. Crecelius, Battelle Pacific Northwest Laboratories, Marine Sciences Laboratory, Sequim, WA, personal communication, June 1995).
- ^f Analysis by inductively coupled plasma atomic emission spectrophotometry (ICP).
- ^g Analysis by cold vapor atomic absorption spectrophotometry (CVAA).
- ^h Analysis by HAA.
- ⁱ Analysis by gas chromatography/flame photometric detection (GC/FPD) (E. Crecelius, Battelle Pacific Northwest Laboratories, Marine Sciences Laboratory, Sequim, WA, personal communication, June 1995).
- ^j Analysis by gas chromatography/electron capture detection (GC/ECD), except where otherwise noted.
- ^k Analysis by high-resolution GC/high-resolution mass spectrometry (HRGC/HRMS).
- ^l Analysis by gas chromatography/mass spectrometry. Detection limits of less than 1 ppb can be achieved using high-resolution gas chromatography/mass spectrometry (HRGC/HRMS).
- ^m Values in parentheses represent ranges for individual Aroclors.